

**2003 Summary Report  
Missouri Nutrition Surveillance System**

# **Pediatric Nutrition Surveillance**



**Missouri Department of Health and Senior Services**

## **Preface**

This report summarizes selected key pediatric health indicators of infants and children, aged from birth to 5 years, participating in the Missouri WIC in 2003, which contributed to the Missouri Pediatric Surveillance System in 2003.

Missouri Department of Health and Senior Services

In accordance with Federal law and U.S. Department of Agriculture policy, this institution is prohibited from discriminating on the basis of race, color, national origin, sex, age, or disability. To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Ave. SW, Washington, DC, 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

## TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	4
INTRODUCTION .....	6
DEMOGRAPHIC CHARACTERISTICS.....	7
Race/Ethnicity .....	7
Age .....	9
PEDIATRIC HEALTH INDICATORS .....	10
Low Birthweight .....	10
High Birthweight .....	12
Short Stature .....	14
Underweight .....	17
Overweight .....	20
Overweight and At Risk of Overweight (2 to 5 years of age) .....	21
Anemia .....	25
Breastfeeding .....	28
CONCLUSIONS AND RECOMMENDATIONS .....	30
REFERENCES .....	32

## EXECUTIVE SUMMARY

The Pediatric Nutrition Surveillance System (PedNSS) is a national surveillance system created and maintained by the Centers for Disease Control and Prevention (CDC). The purpose of this system is to monitor the nutritional status of low-income children in federally funded maternal and child health programs. In 2003, the Missouri PedNSS was composed of data collected exclusively from infants and children participating in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). Thus, this report describes the nutritional status of low-income children in Missouri from birth up to the fifth birthday during the calendar year 2003. The data on birthweight, short stature, underweight, overweight, anemia and breastfeeding were collected in WIC clinics, analyzed by CDC, and used in this report.

Birthweight. Low birthweight is the single most important factor affecting neonatal mortality and is a determinant of post-neonatal mortality. In Missouri, no improvements in low birthweight have been observed in the PedNSS population from 1994 to 2003. In 2003, low birthweight remained an area of concern for the Black/Non-Hispanic racial and ethnic group, because it affected every eighth infant and child in this group. However, the prevalence of high birthweight has been slightly decreasing since 1996; and in the Missouri 2003 PedNSS, the prevalence was lower than the national. The American Indian/Alaskan Native had the largest proportion of babies born overweight – one in eight infants born to American Indian or Alaskan Native mothers in 2003 had high birthweight.

Short stature could indicate chronic malnutrition. The Missouri PedNSS rates for short stature have had a small fluctuation from 1994 to 2003, and the percentage of short stature infants and children was higher than the average of all other states participating in the surveillance system in 2003. American Indian/Alaskan Native infants and children showed the highest prevalence of this pediatric health indicator in 2003. The rates in short stature decreased with the age of children in 2003.

Weight and height were measured to assess the nutritional status of children participating in the PedNSS. In Missouri PedNSS, the prevalence of underweight has been slightly declining from 1994 to 2003, and in 2003, was lower than in the national PedNSS. The highest rate was in the Black/Non-Hispanic children. Infants (under 12 months of age) were more likely to be underweight compared to other age groups. The rates in overweight have been increasing during the previous 10 years. However, the 2003 Missouri proportion of PedNSS participants that were overweight was lower than the national rate.

The overweight rate among children aged 2 to 5 years who participated in the Missouri PedNSS has been increasing from 1994 to 2003. In 2003, Hispanic children were more likely to be overweight, while Black/Non-Hispanic children illustrated the lowest rates in overweight. The proportion of overweight children increased with age – the older the children, the more likely they were to be overweight in 2003.

Iron deficiency anemia. In Missouri, major improvements have occurred in the prevalence of iron deficiency anemia. From 1994 to 2003 the percentage of PedNSS infants and children with low hemoglobin/hematocrit was reduced by 66%. Still, the state's prevalence was higher than the national PedNSS. Almost one fourth of the Black/Non-Hispanic PedNSS participants in

2003 had low hemoglobin/hematocrit. Infants aged 6-11 months were at the highest risk of iron deficiency compared to all other age groups.

Breastfeeding. The percentage of breastfeeding initiation in Missouri PedNSS has been increasing over the last 10 years, but the proportion of ever breastfed babies remained lower in 2003 compared to the national PedNSS data. The Black/Non-Hispanic infants were less likely to be breastfed at birth.

## INTRODUCTION

The Pediatric Nutrition Surveillance System is a child-based public health surveillance system that monitors the nutritional status of low-income, nutritionally at-risk children who participate in federally funded maternal and child health programs. The goal of PedNSS is to collect, analyze, and distribute surveillance data to assist in planning public health nutrition interventions.

In 2003, the Missouri PedNSS represented infants and children who were enrolled in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). Data were collected for infants and children up to the fifth birthday, who visited WIC clinics for routine care and nutrition services, including nutrition education and supplemental food. In 2003, the data included demographic information (race/ethnicity and age of the participants), birthweight (low birthweight, high birthweight), growth (short stature, underweight, overweight, risk of overweight), anemia (low hemoglobin/hematocrit), breastfeeding (breastfeeding initiation, duration, and exclusive breastfeeding).

This report summarizes 2003 PedNSS data, highlights trends in key indicators from 1994 through 2003, monitors the Healthy People 2010 objectives, and compares selected data on child health in Missouri with the Nation, which in 2003 included 44 contributors and records for more than 5 million children from birth to 5 years of age [1].

In 2003, the Missouri PedNSS reflected 136,951 records on infants and children aged less than 5 years. Almost 21,000 records were received from Jackson County. St. Louis City was represented by 14,353 infants and children who participated in WIC in 2003, and 8,376 records from St. Louis County were included in the analysis. The largest number of records contributed from one clinic was from the Springfield-Greene County WIC agency that collected data on 6,104 infants and children.

### Limitations of the data used in the Missouri 2003 PedNSS Report

The PedNSS was established to monitor the nutritional status of low-income infants and children. In Missouri, only the WIC program contributed to the PedNSS; therefore, the Missouri PedNSS does not represent all low-income infants and children. Care must be taken when comparing PedNSS among states and the national PedNSS, as the data were not always collected from identical populations.

Many pediatric health indicators vary in different age and race/ethnic groups. As a result when comparing the rates between counties or clinics in Missouri, these variations must be considered.

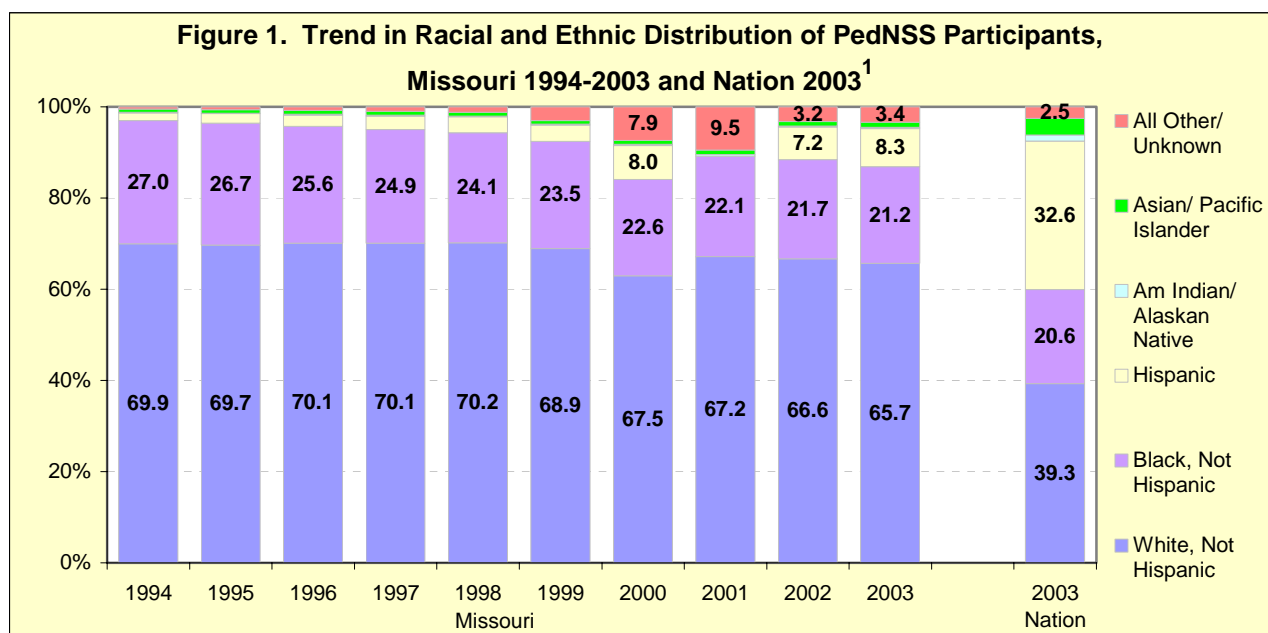
However, PedNSS is a unique data set. It is the largest, most diverse (racially, ethnically, and geographically) data set available on low-income infants and children. Contribution only WIC data to the PedNSS in Missouri allows easier application of the conclusions and recommendations to WIC participants from birth to 5 years of age. Thus, it helps determine risk factors to assist in planning interventions to decrease infant mortality and nutrition-related health problems among the state's low-income infants and children.

## DEMOGRAPHIC CHARACTERISTICS

Demographic information, such as race/ethnicity and age, was associated with differences in birth outcomes, greater health risks and poor growth status of infants and children. The impact of these characteristics on key pediatric health indicators will be discussed throughout this report.

### Race/Ethnicity

In the Missouri 2003 PedNSS, 65.7% of the records were from non-Hispanic white children, 21.2% from non-Hispanic black children, 8.3% from Hispanic children, 1.1% from Asian/Pacific Islander children, 0.3% from American Indian/Alaskan Native children, and 3.4% from children of all other or unspecified races and ethnicities. Racial and ethnic composition of PedNSS participants has been changing over 10 last years (Figure 1)<sup>1</sup>. The proportion of Hispanic children has been increasing from 1.7% in 1994 to 8.3% in 2003<sup>2</sup>. Compared to the average of all other states participating in PedNSS, the Missouri PedNSS proportions of Hispanic (8.3% in Missouri and 32.6% in the nation) and Asian/Pacific Islander children (1.1% and 3.7%, respectively) were smaller, while the proportion of White/Non-Hispanic and All Other/Unknown categories were larger in Missouri<sup>3</sup>.



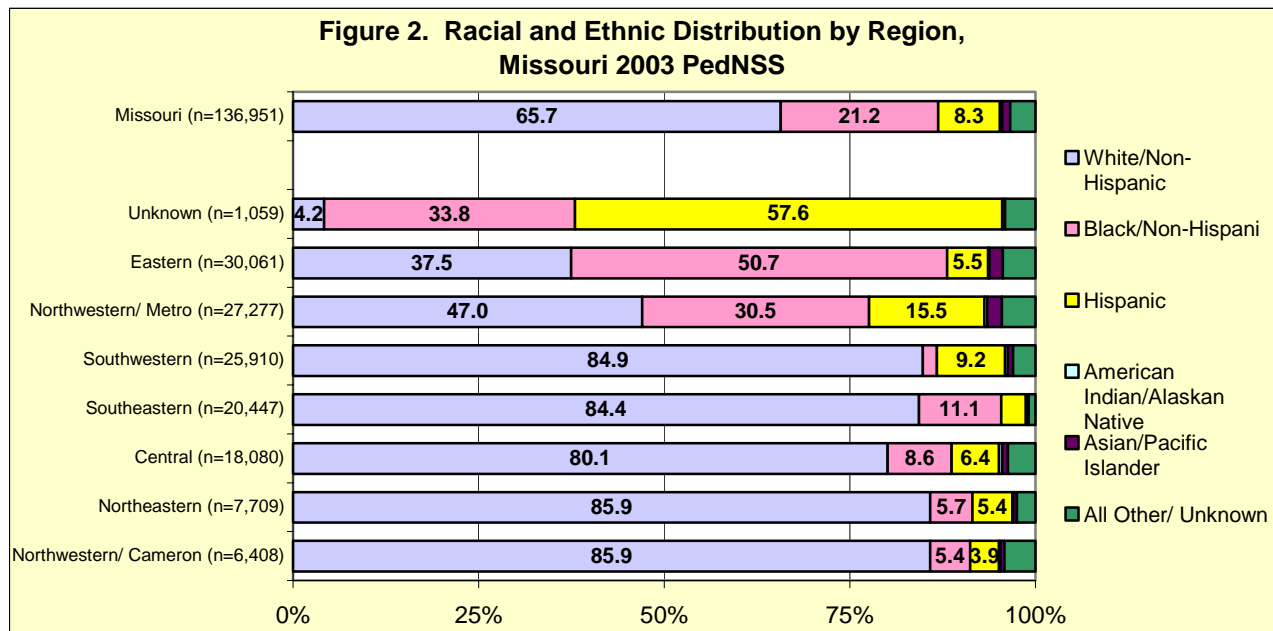
Comparison of racial and ethnic distribution by district in Missouri showed a big dissimilarity between different regions (Figure 2). For example, White/Non-Hispanic children in

<sup>1</sup> For convenience, the percentages for only the large racial and ethnic groups were shown on Figure 1.

<sup>2</sup> In 2001, the proportion of infants and children of Hispanic ethnicity remained unknown due to a definition change.

<sup>3</sup> This difference in racial and ethnic distribution makes it necessary to adjust Missouri data on some indicators to national, as if the racial and ethnic composition in the state and national PedNSS was identical. The adjusted numbers that differ from those in CDC tables for Missouri PedNSS will be announced.

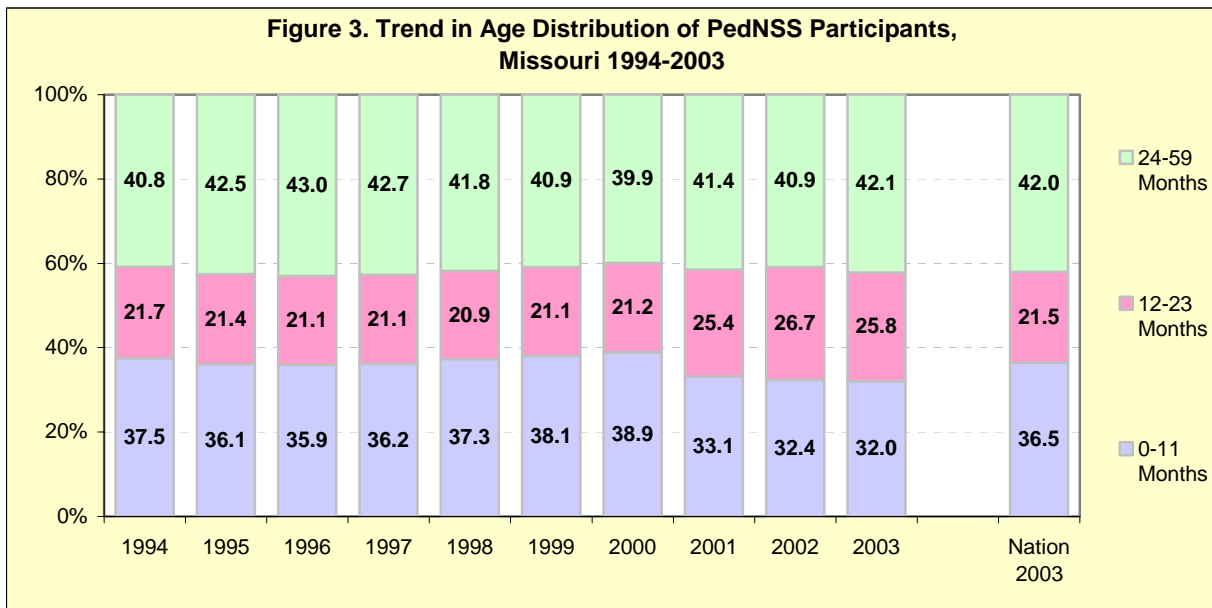
Northeastern and Northwestern/Cameron districts made up 85.9%, while in the Eastern region this race/ethnic group was represented by 37.5% of the PedNSS population. The largest percentage of Black/Non-Hispanic PedNSS participants (50.7%) was in the Eastern district and the smallest in the Southwestern (1.9%) district. The Northwestern /Metro region had 15.5% of Hispanic children, while the Southeastern region had only 3.3%. This large difference in racial and ethnic distribution in Missouri PedNSS territorial districts did not allow comparing rates among the regions.





## Age

In the Missouri 2003 PedNSS, more than two thirds of the Missouri PedNSS records (67.9%) were from children aged 12 to 59 months. Infants represented 32.0% of the Missouri 2003 PedNSS: 30.2% aged 0-5 months, and 1.8% aged 6-11 months (Figure 3). These proportions have changed slightly during the past 10 years. Nationally, 36.5% of PedNSS participants in 2003 were younger than 12 months, 21.5% were in the age group 12-23 months, and 42.0% aged 24-59 months.

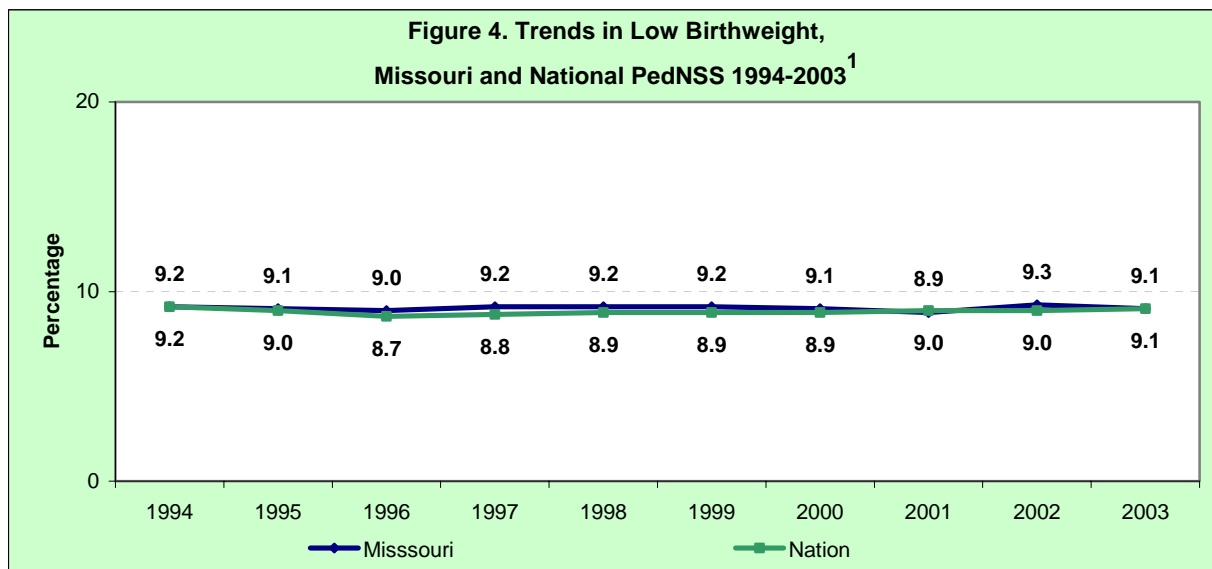


## PEDIATRIC HEALTH INDICATORS

### Low Birthweight

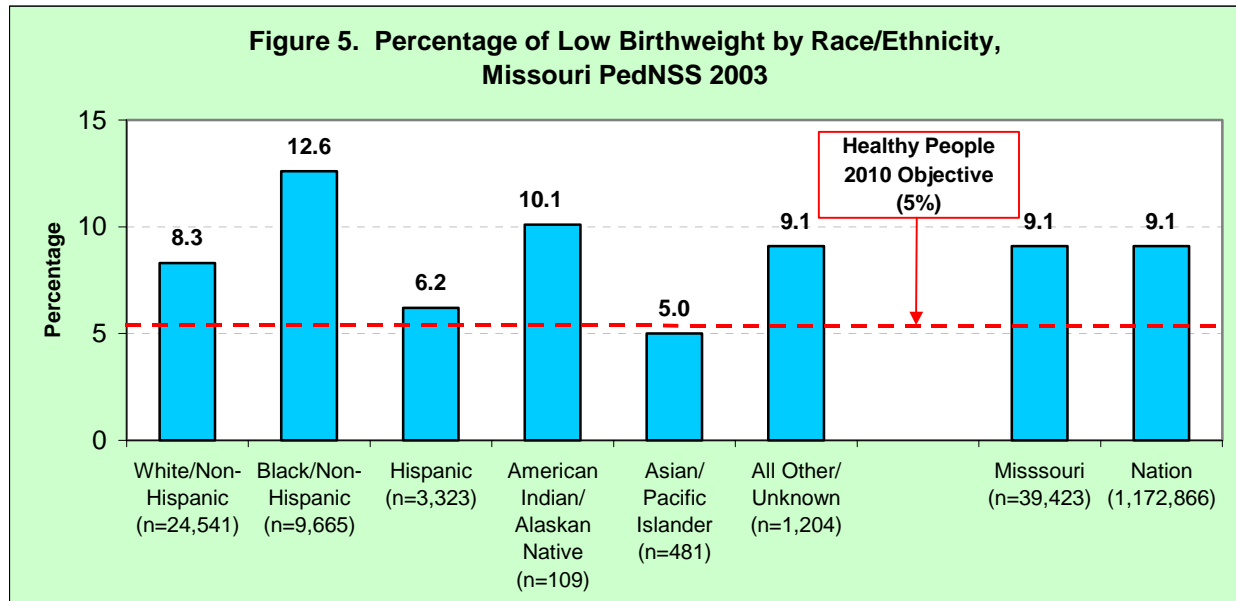
Low birthweight (less than 2,500 grams or 5.5 pounds) is a major determinant of neonatal mortality and post-neonatal mortality [1]. Infants with low birthweight are more likely to experience developmental delays and disabilities than infants with normal birthweight [2]. Low birthweight risk factors include poor maternal nutrition and maternal risk behaviors, especially smoking, drinking alcohol and the use of non-prescribed drugs. Some researches suggested that regular intake of a recommended prenatal amount of folic acid and micronutrient supplements throughout pregnancy may reduce the risk of having a low birthweight baby [3, 4]. Healthy People 2010 Objective seeks to reduce low birthweight to 5% of all live births.

The Missouri 2003 PedNSS population had a low birthweight rate of 9.1%, the same as the average of all states participating in the surveillance system. During the last 10 years this rate has been stable (Figure 4)<sup>1</sup>. Thus, there has been no noticeable movement in achieving the Healthy People 2010 goal.



<sup>1</sup> To show more details, a 20% scale was used in Figure 4.

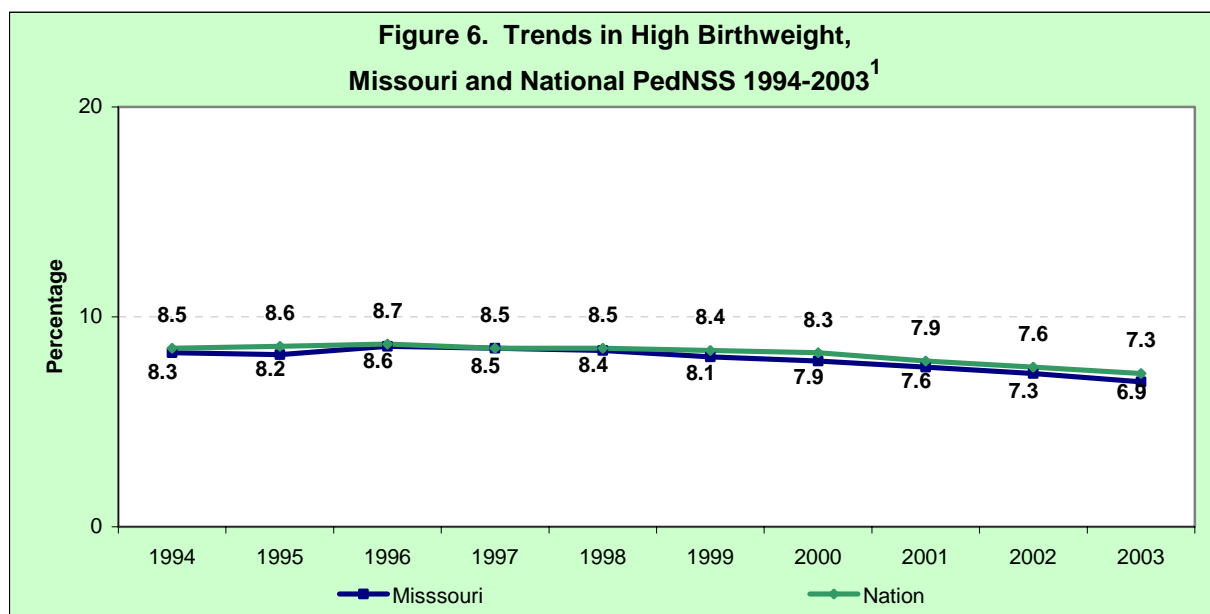
The percentage of low birthweight in the Missouri 2003 PedNSS varied by race and ethnicity. The prevalence was 2.5 times higher among Black/Non-Hispanic PedNSS participants (12.6%) than in Asian/Pacific Islander infants (5.0%) (Figure 5). As a result, Asian/Pacific Islander and Hispanic infants were about to achieve the national goal of 2010 Healthy People.



## High Birthweight

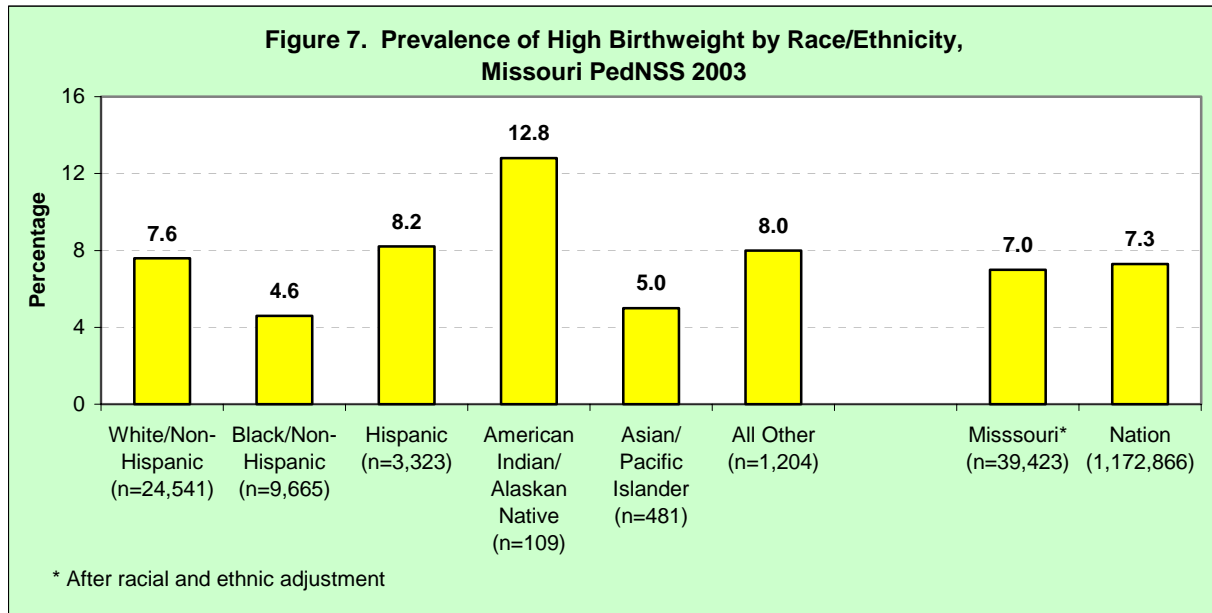
High birthweight (greater than 4,000 grams) increases the risk for infant death and birth injuries such as shoulder dystocia and congenital anomalies (especially heart disease) [5]. High birthweight may result in obesity in childhood that may extend into adult life [6]. Maternal prepregnancy overweight and greater than ideal maternal weight gain can be considered as strong predictors of high birthweight [7].

In the 2003 Missouri PedNSS, 6.9% of infants were born overweight (Figure 6)<sup>1</sup>. During the last 10 years this rate was highest in 1996 (8.6%) and lowest in 2003. Since 1996, the rate has been gradually decreasing. This gradual decrease indicates that some progress has been made in the prevention of high birthweight.



<sup>1</sup> To show more details, a 20% scale was used in Figure 6.

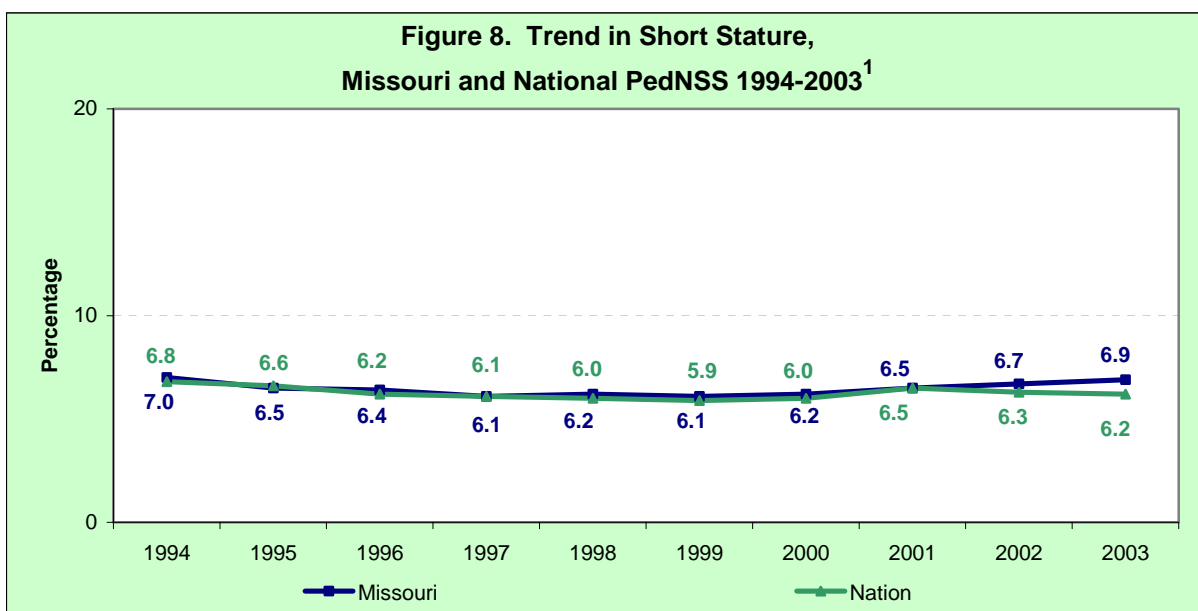
Compared to the national percentage, the state's proportion of PedNSS infants born overweight was lower in 2003 (Figure 7). The prevalence of high birthweight varied by racial and ethnic group and was highest in American Indian/Alaskan Native babies (12.8%) and lowest in infants from the Black/Non-Hispanic racial and ethnic group (4.6%).



## Short Stature

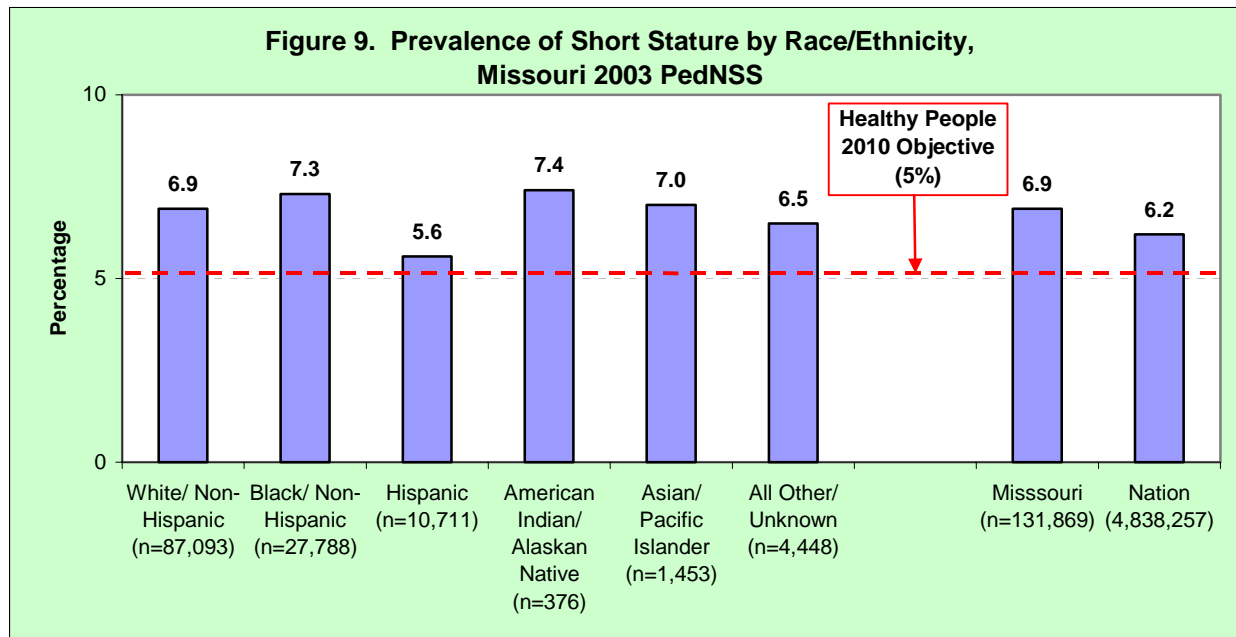
Short stature is defined as a length or stature less than 5<sup>th</sup> percentile on the CDC age- and gender-specific length or stature reference. Short stature, also referred to as low-length/height-for age or stunting, is used as an indicator of chronic malnutrition and it reflects the long-term health and nutritional history of a child. In some children short stature may be related to factors such as lower birthweight. One of the Healthy People 2010 objectives is to reduce growth retardation among low-income children under 5 years of age to 5%.

The prevalence of short stature in Missouri PedNSS has been fluctuating from 1994 through 2003 year (Figure 8)<sup>1</sup>. The lowest prevalence of 6.1% was in 1997 and 1999, and the highest prevalence of 7.0% was in 1994.



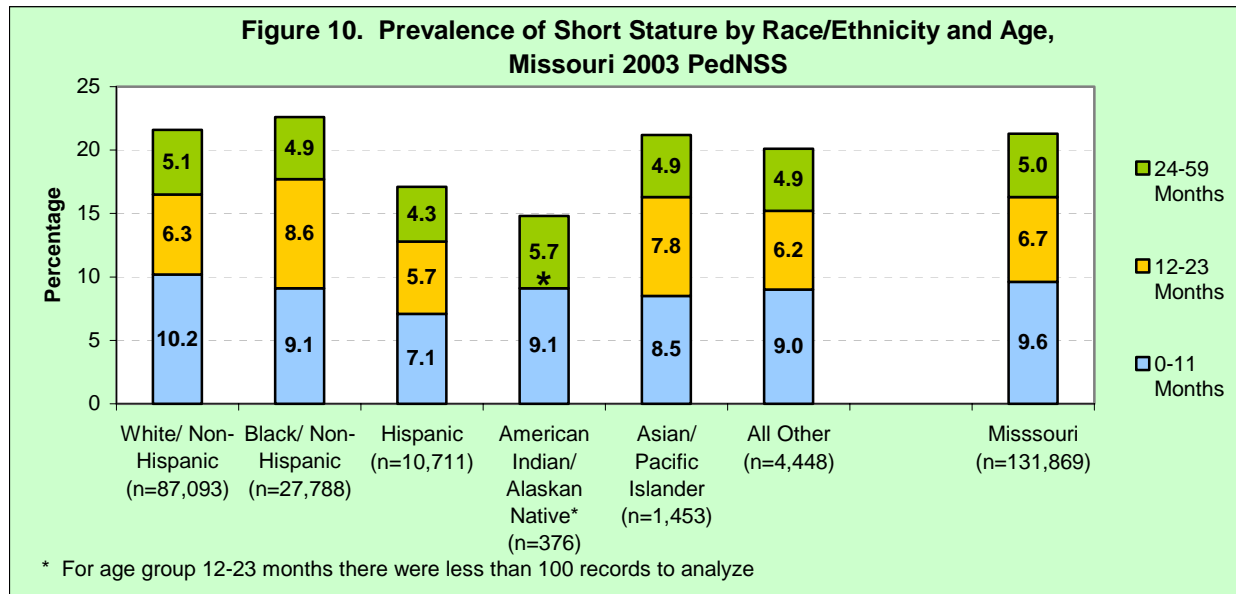
<sup>1</sup> To show more details, a 20% scale was used in Figure 8.

The state's rate (6.9%) was higher than the average of all other states participating in the PedNSS in 2003 (Figure 9). The prevalence of short stature in Missouri and the national PedNSS in year 2003 was above the 2010 Healthy People goal. In the 2003 Missouri PedNSS infants and children in American Indian/Alaskan Native<sup>1</sup> (7.4%) and Black/Non-Hispanic (7.3%) racial and ethnic groups were more likely to have short stature; while Hispanic participants were less likely to report short stature (5.6%).



<sup>1</sup> It was unusual for American Indian/Alaskan Native to have that high rate in short stature in Missouri PedNSS 2003. The fluctuation could be due to small number of records in this race and ethnicity.

In the Missouri 2003 PedNSS, the prevalence of short stature was decreasing with the age of the participants (Figure 10). In the age group younger than 1 year the highest prevalence of short stature was among White/Non-Hispanic infants (10.2%) and the lowest was in the Hispanic ethnic group (7.1%). In the age group of 1 to 2 years old, the children in the Black/Non-Hispanic race/ethnic group were more likely to have short stature (8.6%). The Hispanic children in this same age group had a lower prevalence of 5.7%. In the 2003 Missouri PedNSS, almost all racial and ethnic groups of children age 24-59 months achieved the Healthy People 2010 objective. The American Indian/Alaskan Native children had a higher prevalence of short stature in this age group (5.7%).

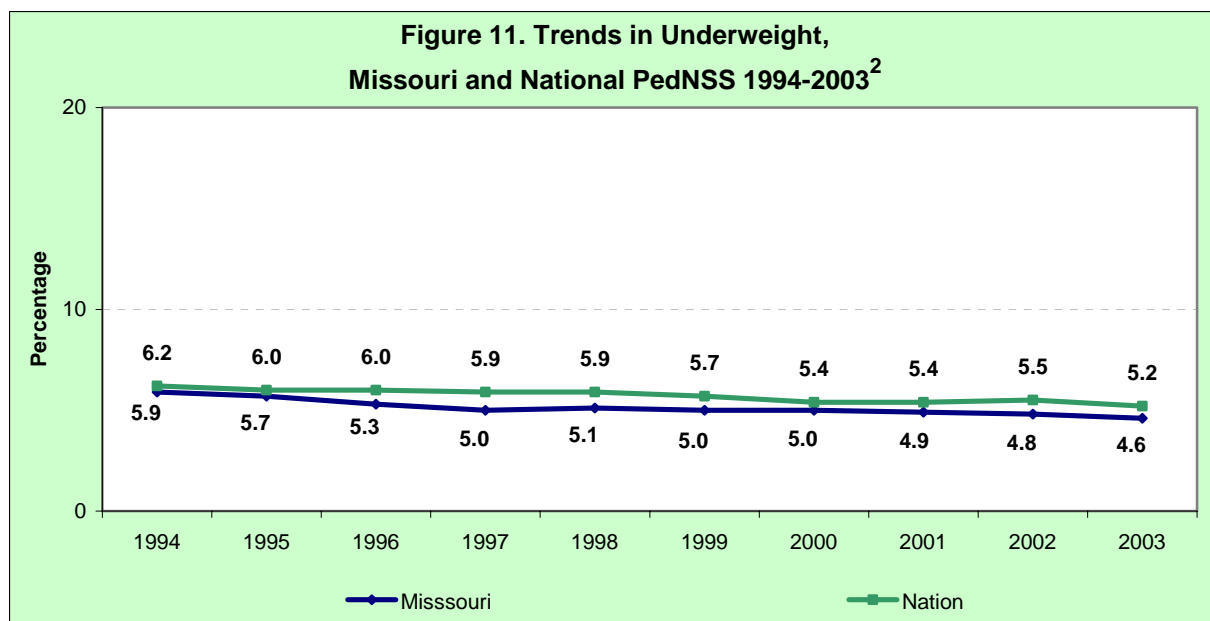




## Underweight

Underweight in the PedNSS is based on the 2000 CDC gender-specific growth chart percentiles of less than the 5<sup>th</sup> percentile weight-for-length for children younger than 2 years of age and less than the 5<sup>th</sup> percentile BMI<sup>1</sup>-for-age for children aged 2 years or older. Food shortages and disease outbreaks can result in high prevalence of underweight infants and children, so an underweight prevalence rate greater than 5% may indicate serious health and nutrition problems.

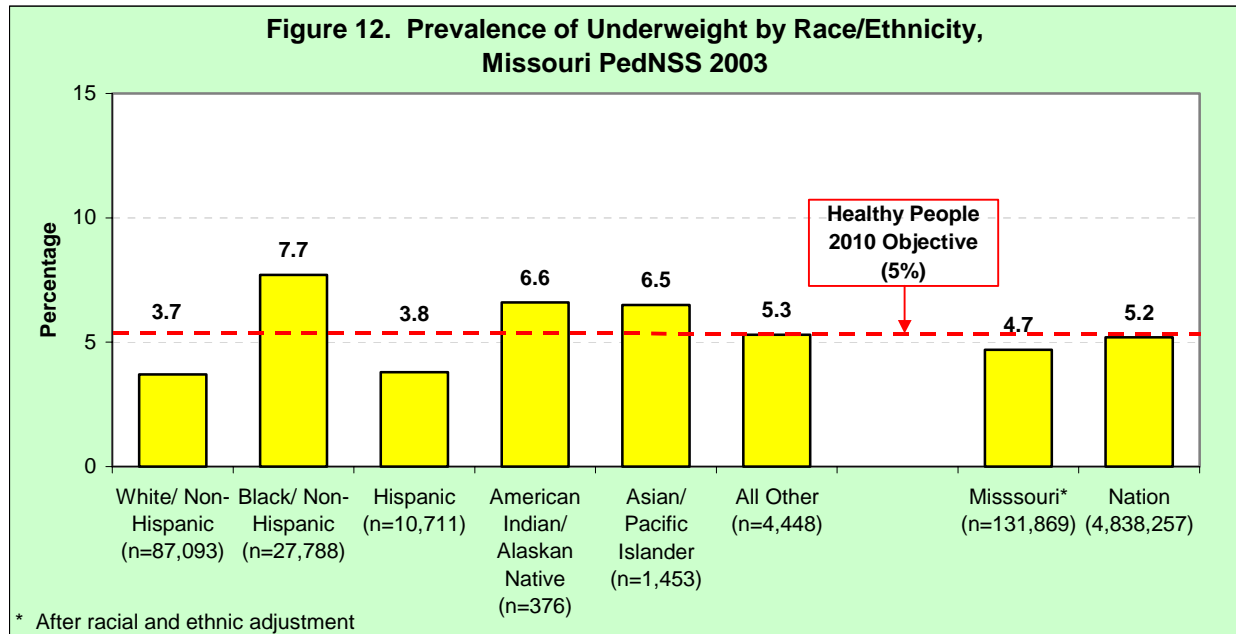
Over last 10 years the prevalence of underweight in the Missouri PedNSS has been decreasing from 5.9% in 1994 to 4.6% in 2003 (Figure 11)<sup>2</sup>. Overall, the 2003 rate indicated that acute malnutrition was not a public health problem in the Missouri PedNSS population, because the prevalence of underweight children under 5 years of age in 2003 (4.6%) was lower than expected by Healthy People 2010 goal (5.0%).



<sup>1</sup> BMI, Body Mass Index, is weight in kilograms divided by height in meters squared (kg/m<sup>2</sup>).

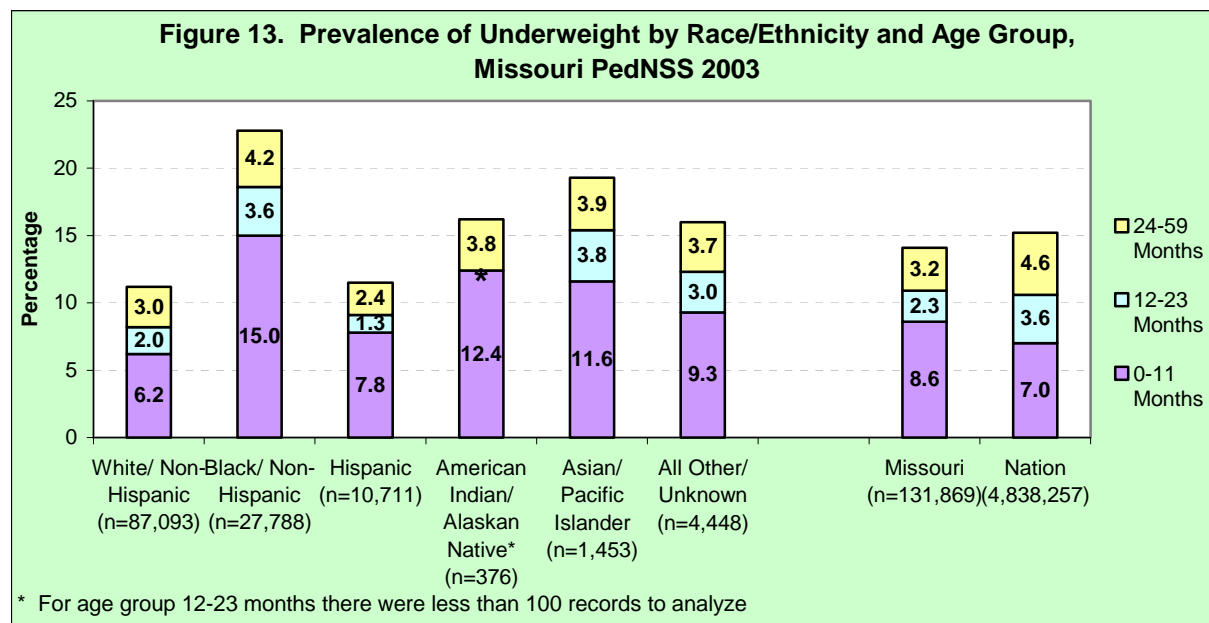
<sup>2</sup> To show more details, a 20% scale was used in Figure 11.

The highest prevalence of underweight in the Missouri PedNSS 2003 occurred among Black/Non-Hispanic children (7.7%) (Figure 12). The percentage of American Indian/Alaskan Native (6.6%) and Asian/Pacific Islander (6.5%) children being underweight was higher than the Healthy People 2010 goal.



Infants (0-11 months old) were at higher risk to be underweight in the Missouri PedNSS population in year 2003 (8.6%) compared to other age groups. The proportion was higher than the average of all states participating in PedNSS in 2003 (Figure 13).

Among different age groups, the highest proportion of infants (0-11 months) being underweight was in Black/Non-Hispanic PedNSS population (15.0%). This means that every 7<sup>th</sup> baby in Black/Non-Hispanic Missouri PedNSS infants was underweight in 2003. The fact may reflect the high rate of low birthweight in this group. Children age 24-59 months of the Black/Non-Hispanic race/ethnic group were 1.75 times more likely to have low weight (4.2%) than Hispanic children in the same age group (2.4%), and 1.4 times than White/Non-Hispanic children (Figure 13). Among children 12 to 23 months old the Asian/Pacific Islander were more likely to be underweight, compared to all other ethnic groups<sup>1</sup> (3.8%). The Hispanic children were less likely to be underweight in this age group (1.3%).

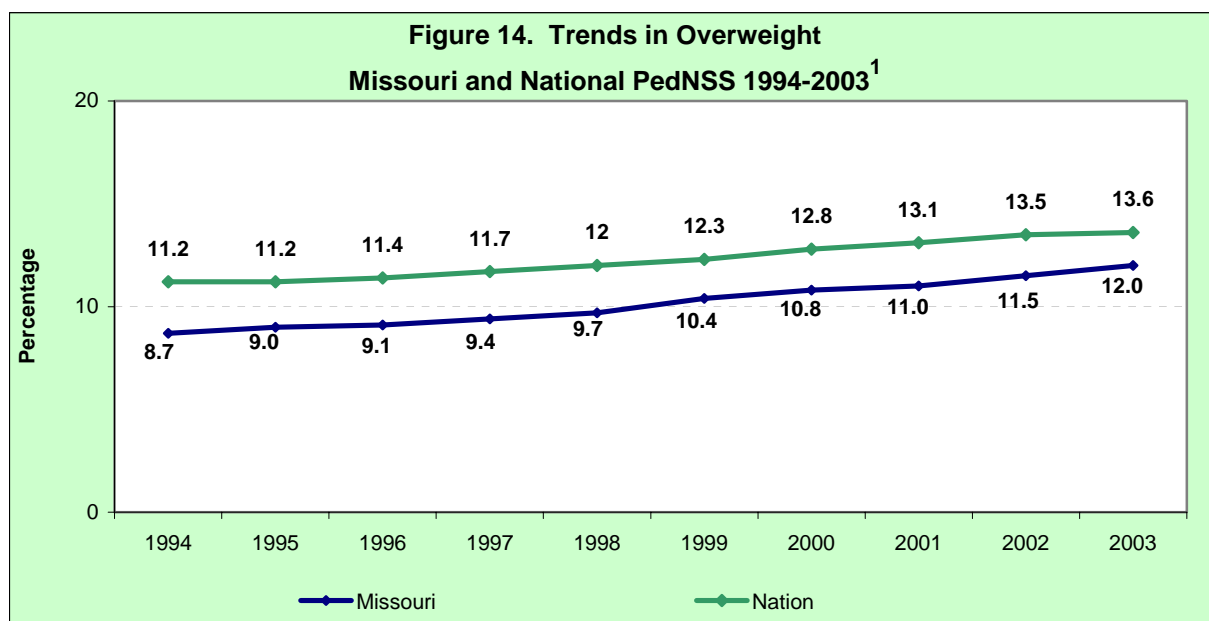


<sup>1</sup> American Indian/Alaskan Native group of children aged 12-23 months had less than 100 records to analyze, so this group was excluded from analysis on overweight by age group and by race/ethnicity

## Overweight

The prevalence of childhood and adolescent overweight has tripled over the past two decades and associations have been identified between dietary patterns, physical activity, sedentary behaviors, and overweight [8]. In the PedNSS, overweight is defined as high weight for length or BMI-for-age and is based on the 2000 CDC growth chart percentiles of greater than or equal to the 95<sup>th</sup> percentile weight-for-length for children less than 2 years of age and greater than the 95<sup>th</sup> percentile BMI-for-age for children 2 years of age or older.

In the Missouri 2003 PedNSS, during the last 10 years the proportion of overweight in children from birth to age 5 years has been increasing from 8.7% in 1994 to 12.0% in 2003 (Figure 14)<sup>1</sup>. The national proportion in the PedNSS was higher (13.6%) than the Missouri proportion in the year 2003.

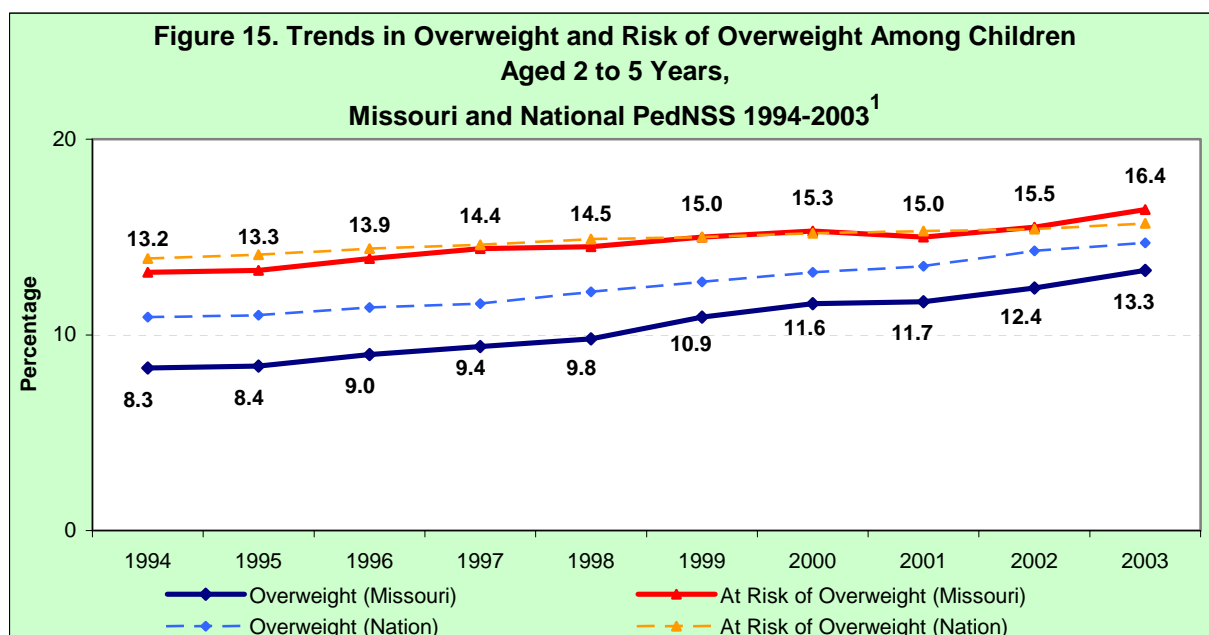


<sup>1</sup> To show more details, a 20% scale was used in Figure 14.

## Overweight and At Risk of Overweight (2 to 5 years of age)

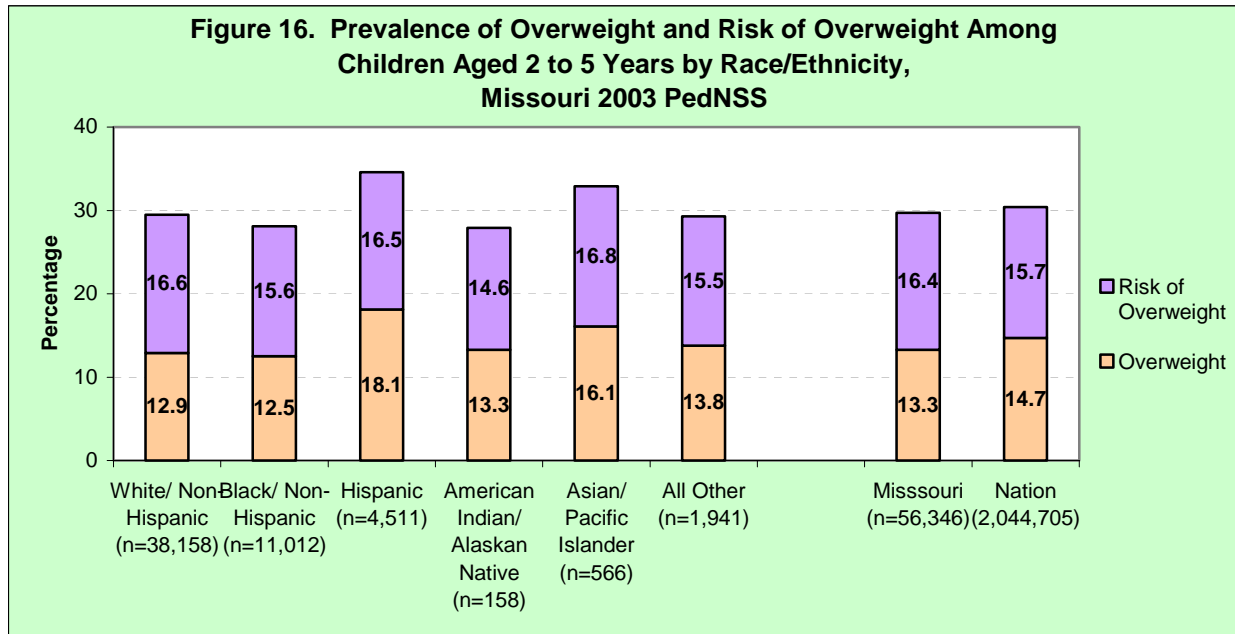
Overweight in children younger than 2 years old does not cause the same risk as for children aged 2 or older, because a weak association has been found between the 2 years or older age group's weight and an increased risk for adult obesity [9]. Expert committees have recommended a two-level screening for overweight in children aged 2 years or older. The suggestion was to use BMI-for-age at or above the 95<sup>th</sup> percentile to define overweight and between the 85<sup>th</sup> and 95<sup>th</sup> percentile to define risk of overweight [10].

Over the 10 previous years, the rates of overweight and at risk of overweight among Missouri PedNSS children, aged 2 to 5 years, have been increasing (Figure 15)<sup>1</sup>. Furthermore, the overweight rate has been escalating more rapidly than the risk of overweight rate.

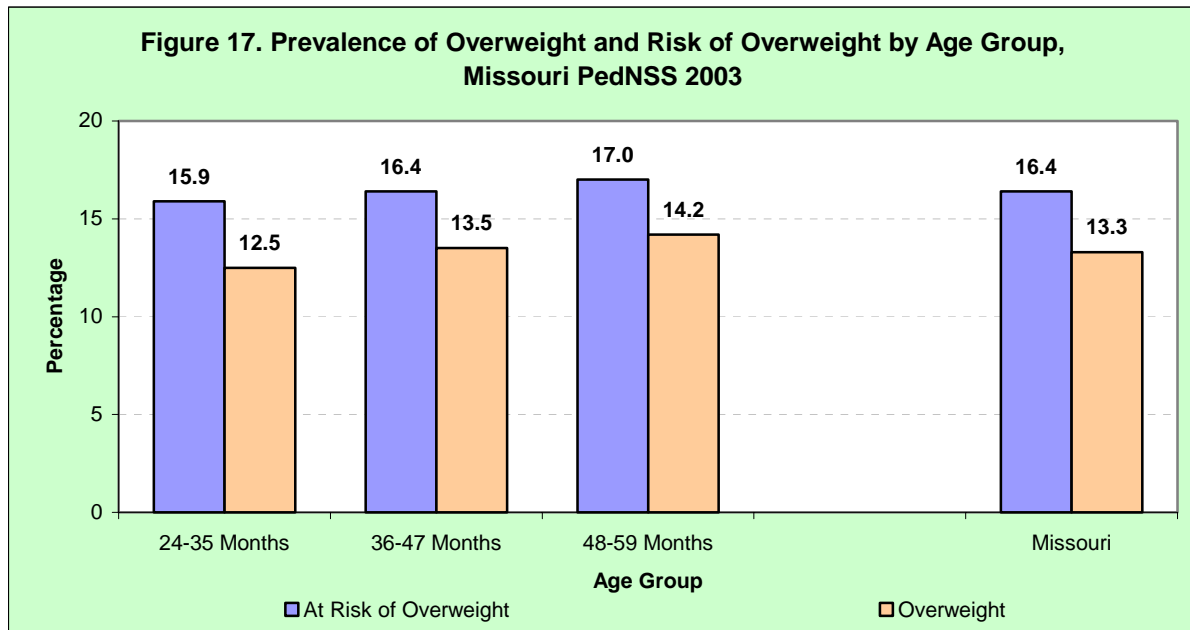


<sup>1</sup> To show more details, a 20% scale was used in Figure 15.

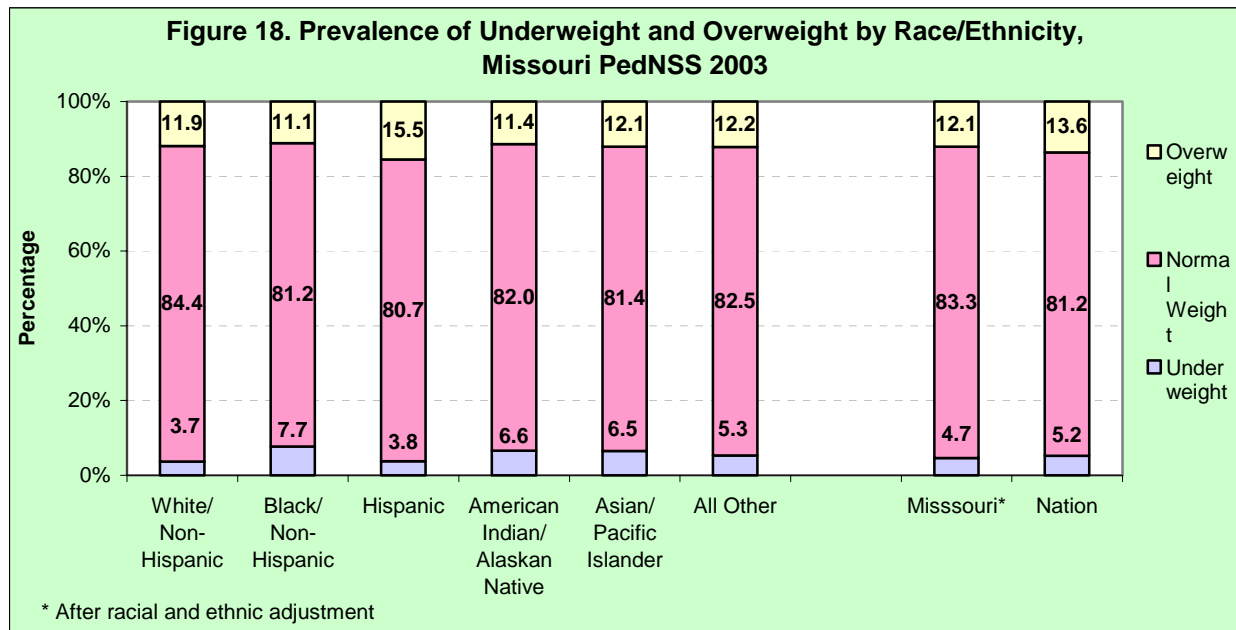
In the Missouri 2003 PedNSS, the highest rate of overweight was among Hispanic children (18.1%) (Figure 16). Black/Non-Hispanic PedNSS children aged 2 to 5 years were the least likely to be overweight (12.5%). Asian/Pacific Islander children in this age group were at highest risk of overweight (16.8%); while American Indian/Alaskan Native had the lowest prevalence of risk of overweight compared to all other racial and ethnic groups (14.6%).



The proportion of overweight children increased with age in the Missouri PedNSS 2003 (Figure 17). In the age group 24-35 months, 12.5% of children were overweight; in the age group 36-47 months, 13.5%; and in the age group 48-59 months, 14.2% of children were overweight. The same pattern occurred in the at risk of overweight: 15.9%, 16.4%, and 17.0% in age groups 24-35 months, 36-47 months, and 48-59 months, respectively.



Generally, in the Missouri 2003 PedNSS, the proportion of children and infants with adequate weight was higher than the average of all other participating states in 2003 (Figure 18). The White/Non-Hispanic portion of the Missouri PedNSS population had the highest percentage of adequate weight (84.4%), while the Hispanic race/ethnicity had the lowest percentage of adequate weight (80.7%).

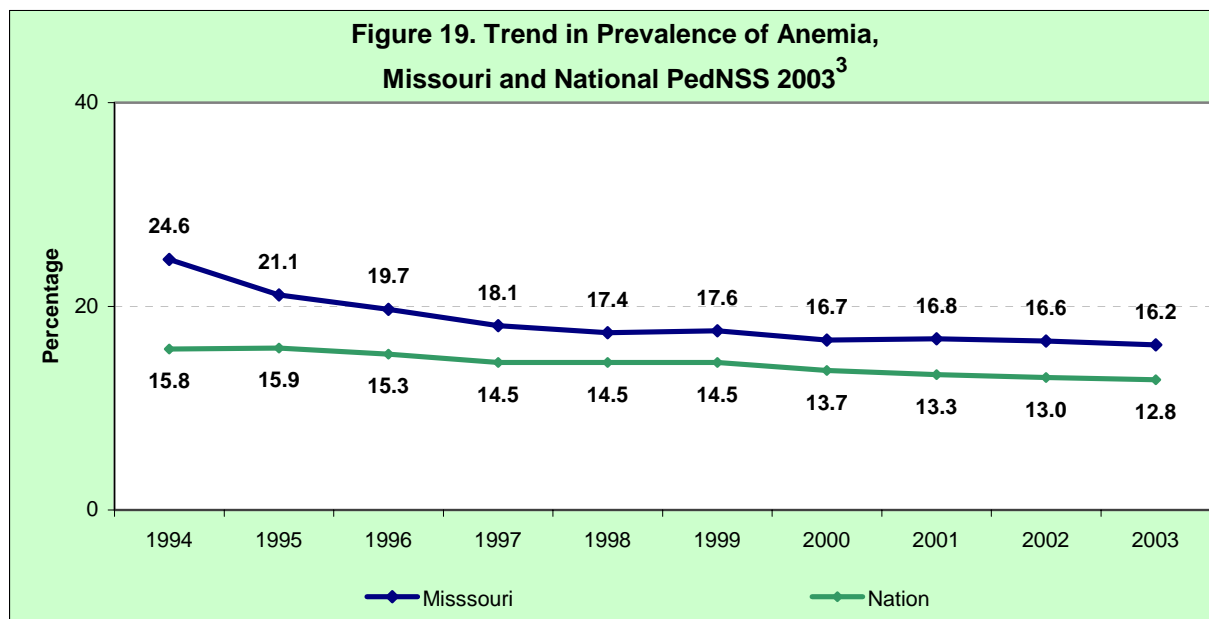




## Anemia

Iron deficiency anemia in the PedNSS refers to a hemoglobin or hematocrit level lower than the age-adjusted reference range for healthy children<sup>1</sup>. Anemia is a most common indicator of nutrient deficiency in the world [11]. Iron deficiency in children was associated with long-lasting diminished mental, motor and behavioral functioning [12]. Racial differences apparently exist, with black children having lower normal values than white and Asian children of the same age and socioeconomic background. The Healthy People 2010 objective was to reduce iron deficiency among children aged 1 to 2 years to 5% and children aged 3 to 4 years to 1%<sup>2</sup>.

In Missouri the prevalence of iron deficiency anemia in infants and children participating in the PedNSS has declined noticeably since 1994 (Figure 19)<sup>3</sup> and reached the lowest point of 16.2% in 2003. Nevertheless, the Missouri rate was still higher than the average of all other PedNSS participating states in 2003.

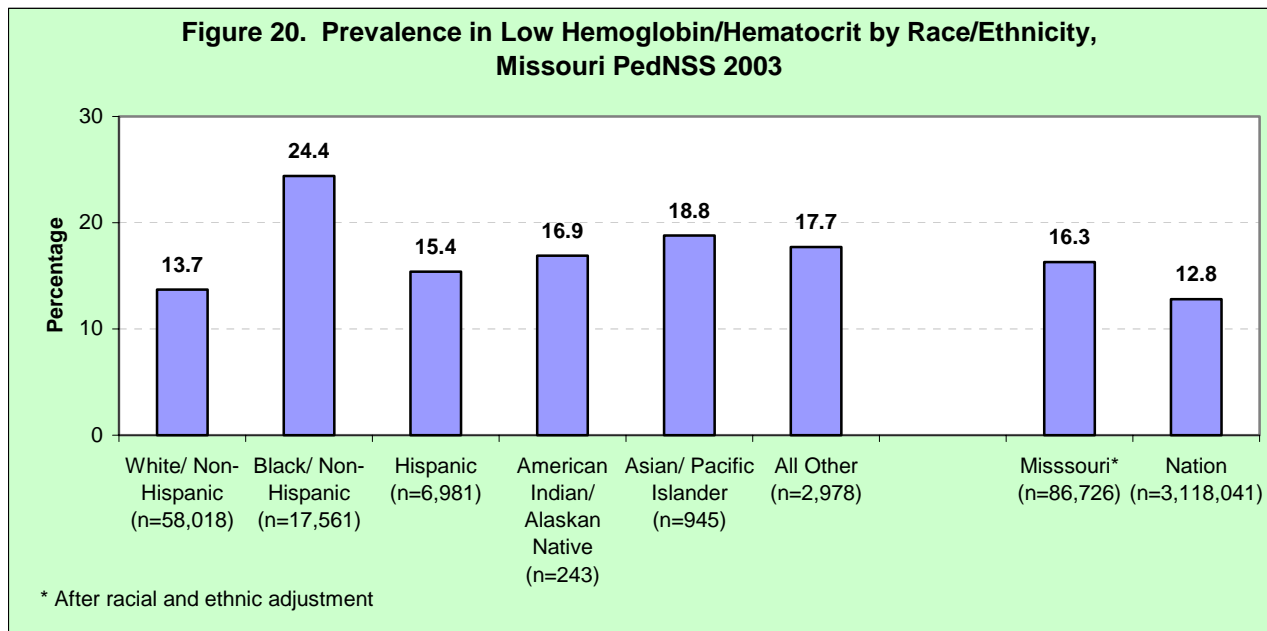


<sup>1</sup> In PedNSS, children aged 1 to 2 years are considered anemic if their hemoglobin concentration is less than 11.0 g/dL or their hematocrit level is less than 33.0%. Children aged 2-5 years are considered anemic if their hemoglobin concentration is less than 11.1 g/dL or their hematocrit level is less than 33.3%

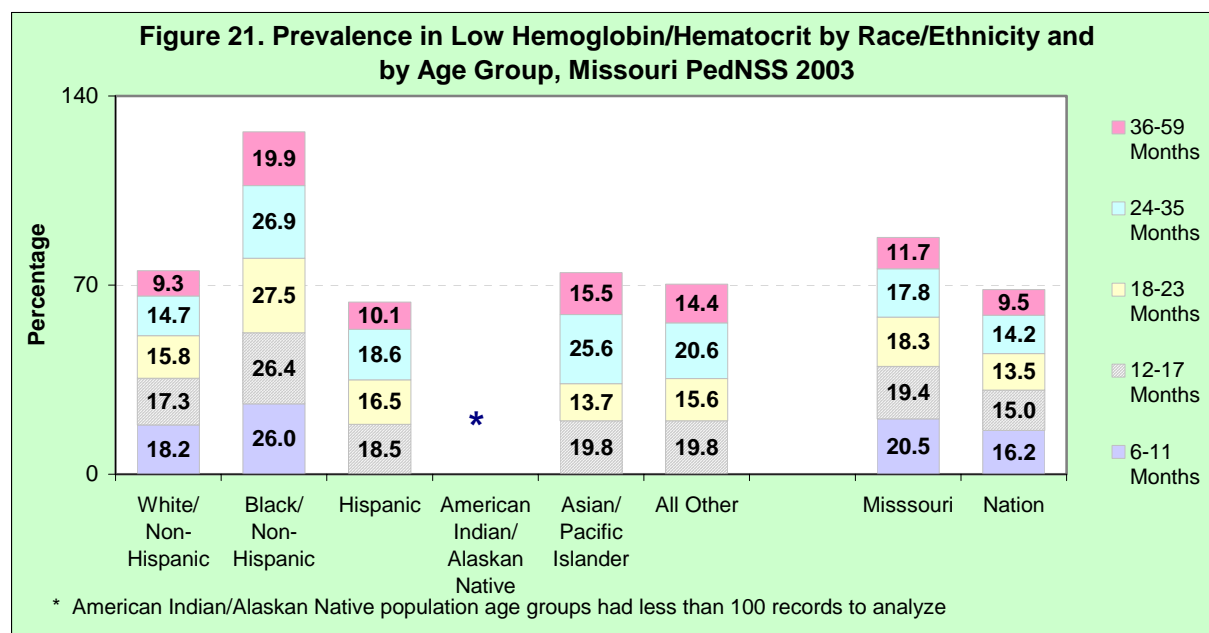
<sup>2</sup> In PedNSS, age groups are 6-11 months, 12-17 months, 18-23 months, 24-35 months, and 36-59 months. Therefore, this classification does not allow comparing low hemoglobin/hematocrit rates between PedNSS and the Healthy People 2010 objective.

<sup>3</sup> To show more details, a 40% scale was used in Figure 19.

The proportion of infants and children with iron deficiency anemia (low hemoglobin/hematocrit) in the Missouri 2003 PedNSS varied in different racial and ethnic groups. The highest proportion of participants having low hemoglobin/hematocrit was in the Black/Non-Hispanic Missouri PedNSS population (24.4%) (Figure 20). The lowest prevalence of iron-deficiency anemia was in the White/Non-Hispanic group (13.7%). However, all race/ethnic groups in the Missouri 2003 PedNSS had rates higher than the average of all other states participating in the PedNSS in year 2003.



The highest prevalence of low hemoglobin/hematocrit in both the Missouri PedNSS and other participating states in 2003 occurred in infants 6-11 months old (20.5% and 16.2% respectively) (Figure 21). The rates decreased as the children got older. Even so, all age groups in Missouri had higher rates compared to national PedNSS in 2003. The Black/Non-Hispanic Missouri PedNSS participants had the highest rates among all age groups<sup>1</sup>. Lower hemoglobin/hematocrit was found among the White/Non-Hispanic PedNSS participants in Missouri.



<sup>1</sup> American Indian/Alaskan Native racial and ethnic group did not have enough records to be analyzed by age group (less than 100)

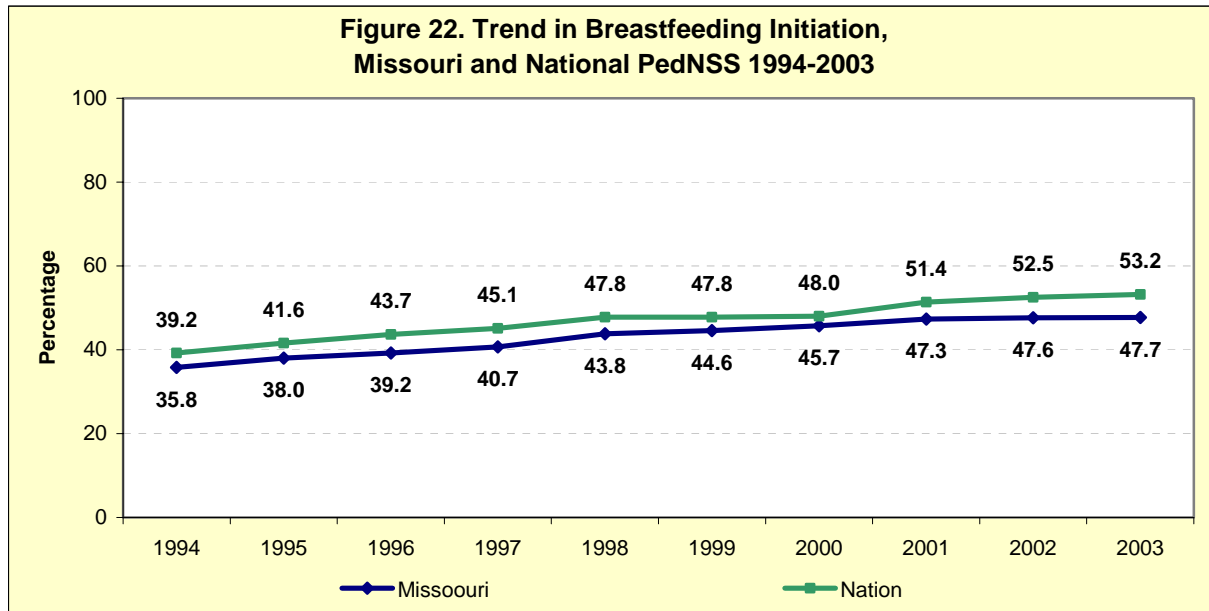
## Breastfeeding

The health and economic benefits of breastfeeding are well documented. According to the American Academy of Pediatrics (AAP), human milk is “uniquely suited” for human infants [13]. With rare exceptions, human milk provides the most complete form of nutrition for infants, including premature and sick newborns [14]. Accordingly, the AAP recommends that infants be breastfed exclusively for the first six months after birth and that breastfeeding continue through the entire first year of life. Breastfeeding after the first 12 months should continue as long as mutually desired. When direct breastfeeding is not possible, expressed human milk, fortified when necessary for the premature infant, should be provided.

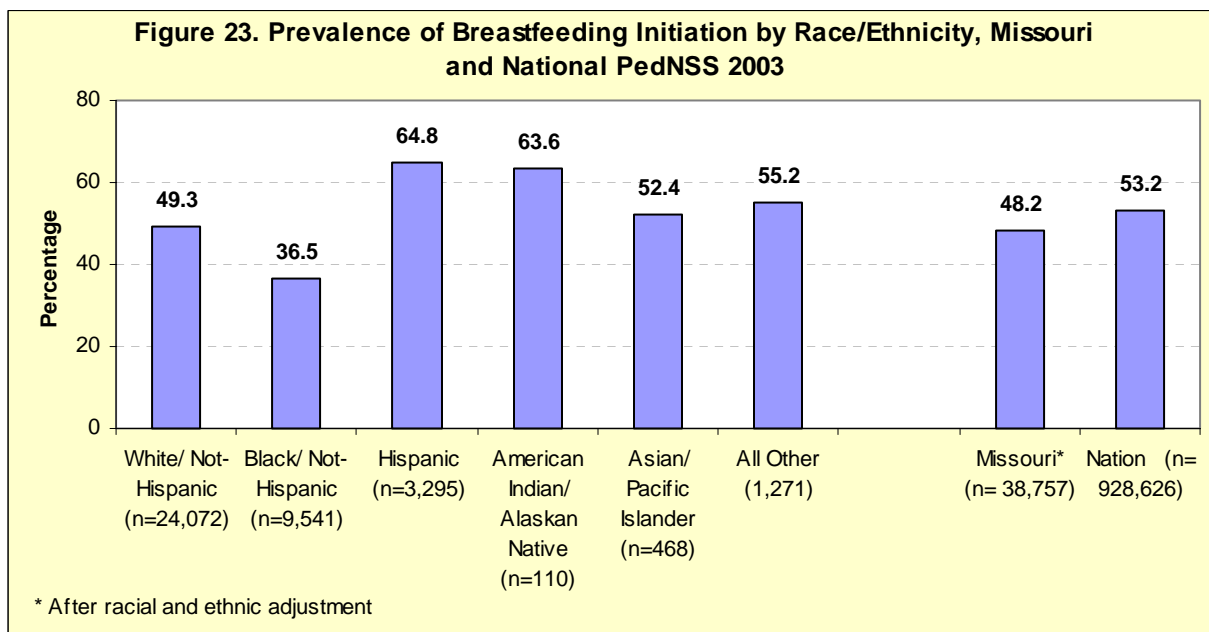
In the PedNSS breastfeeding initiation is determined by ever breastfed, while breastfeeding duration is determined by breastfed at least 6 months and breastfed at least 12 months. These breastfeeding practices were chosen in order to track three of the Healthy People 2010 objectives: increase the proportion of mothers who breastfeed in the early postpartum period to 75% (objective 16-19a); increase the proportion of mothers who breastfeed at 6 months to 50% (16-19b); increase the proportion of mothers who breastfeed at 1 year to 25% (16-19c).

In Missouri, the Women, Infants and Children (WIC) program collects breastfeeding initiation data when a mother is certified and recertified in the program. If the mother chose to quit breastfeeding, she did not have to report it to the agency – in 2003 the WIC clinics were not required to change breastfeeding information in infants’ records even if the formula voucher was issued. This means, that the data on breastfeeding duration in 2003 were not very full. Beginning in 2005, it is required to update the breastfeeding record every time mothers visit the WIC clinic.

In Missouri, the overall prevalence of breastfeeding initiation in the PedNSS has been increasing over last 10 years from 35.8% in 1994 to 47.7% in 2003 (Figure 22). The Healthy People 2010 objective in ever breastfed (75%) was far from being achieved in the Missouri PedNSS population in year 2003.



In the Missouri 2003 PedNSS, the proportion of ever breastfed babies was lower, compared with national (53.2%) proportion. Hispanic babies were more likely to be breastfed at birth than infants in all other racial and ethnic groups in the Missouri 2003 PedNSS (64.8%) (Figure 23). The Black/Non-Hispanic infants had the lowest prevalence of breastfeeding initiation in 2003 (36.5%).



## Conclusions and Recommendations

An important use of the PedNSS data is monitoring the Healthy People 2010 Objectives. These objectives were designed to serve as a goal for monitoring progress towards improving the health of the nation. The 10-year trend data (from 1994 to 2003) showed some improvements in decreasing the proportion of underweight infants and children in the PedNSS population. Additionally, progress has been made in breastfeeding initiation. However, the 2010 Healthy People objectives pertaining to reduce the percentage of low birthweight and growth retardation have not shown advances (Table 1).

**Table 1**

Healthy People 2010 Objectives that are relevant to the health of infants and children and that can be monitored by PedNSS	2003 National PedNSS data	2003 Missouri PedNSS data	Progress of the Missouri PedNSS population during 1994-2003 years
Increase low birthweight to 5% (16-10b)	9.1	9.1	Stable
Reduce growth retardation among low-income children under 5 years of age to 5% (19-4)	6.2	6.9	Stable
Short Stature	5.2	4.6	22% decrease
Underweight			
Increase the proportion of mothers who breastfeed in the early postpartum period to 75%	53.2	47.7	25% increase
Increase the proportion of mothers who breastfeed at 6 months to 50 % (16-19b)	21.5	No reliable data	
Increase the proportion of mothers who breastfeed at 12 months to 25% (16-19c)	13.6	No reliable data	

The PedNSS data indicate that state public health programs are needed to support the following actions:

- Prevent low birthweight by providing preconception nutrition care and outreach activities to promote early identification of pregnancy and early entry into comprehensive prenatal care, including medical care and WIC program services.
- Identify children with short stature and appropriately follow to assure that they receive adequate nutrients to promote optimal growth; and that there are no other health problems limiting growth
- Implement innovative strategies to reverse the rising trend of overweight in young children by increasing breastfeeding, increasing physical activity, promoting increased consumption of fruits and vegetables, and decreasing sedentary time. Routinely screen

for overweight and risk of overweight using BMI-for-age recommended by the American Academy of Pediatrics Policy Statement [15].

- Conduct hemoglobin/hematocrit screening to identify all infants and children at highest risk of having iron deficiency anemia, develop and implement effective intervention strategies including nutrition education focused on iron rich foods and iron absorption-enhancing foods and provide follow-up to improve iron nutrition status.
- Promote and support breastfeeding through medical care systems, work sites and communities

## REFERENCES

1. CDC. Pediatric Nutrition Surveillance 2003 Report. US Department of Health and Human Services, 2004
1. Ventura SJ, Kimberly MA, Martin JA, et al. Birth and deaths: Unites States, 1996; preliminary data. Monthly vital statistics report; vol 46(1), supp. 2. Hyattsville, MD: National Center for Health Statistics, September 11, 1997
2. Paneth KA. The problem of low birthweight. *Future Child* 1995; 5(1): 19-34
3. Hininger I, Favier M, Arnaud J, Faure H, Thoulon JM, Hariveau E, Favier A, Roussel AM. Effects of a combined micronutrient supplementation on maternal biological status and newborn anthropometrics measurements: a randomized double-blind, placebo-controlled trial in apparently healthy pregnant women. *Eur J Clin Nutr*. 2004 Jan;58(1):52-9
4. Christian P, Khatry SK, Katz J, Pradhan EK, LeClerq SC, Shrestha SR, Adhikari RK, Sommer A, West KR Jr. Effects of alternative maternal micronutrient supplements on low birth weight in rural Nepal: double blind randomized community trial. *BMJ*. 2003 Mar 15;326(7389):571
5. Acker DB, Sachs BP, Frieman EA: Risk factors for shoulder dystocia. *Obstet Gynecol* 1985; 66: 762-8
6. Tanaka T, Matsuzaki A, Kuromaru R. Association between birthweight and body mass index at 3 years of age. *Pediatr Int* 2001;43:641–6
7. Scholl TO, Hediger ML, Schall JJ, Ances IG, Smith WK. Gestational weight gain, prepregnancy outcome, and postpartum weight retention. *Obstetrics and Gynecology*, 1995; 86: 423-7
8. Moyer VA, Klein JD, Ockene JK, Teutsch SM, Johnson MS, Allan JD. Screening overweight in children and adolescents: where is the evidence? A commentary by the childhood obesity working group of the US preventive services task force. *Pediatrics*; Jul 2005, Vol. 116 Issue 1:235-9
9. Whitaker RC, Wright JA, Pepe MS, Seidel KD, Dietz WH. Predicting obesity in young adulthood from childhood and parental obesity. *New England Journal of Medicine* 1997; 337(13):869-873
10. Barlow SE, Dietz WH. Obesity evaluation and treatment; expert committee recommendation. *Pediatrics* (serial on line) 1998; 102(3):e29
11. United Nations International Children's Emergency Fund (1998). *The State of World's Children*. New York: UNICEF



---

12. Kazal LA. Prevention of Iron Deficiency in Infants and Toddlers. American Family Physician; Oct 2002, Vol. 66 Issue 7

13. The American Academy of Pediatrics, RE9729 Policy Statement, December 1997

14. American Academy of Pediatrics. Policy Statement: Breastfeeding and the Use of Human Milk (RE9729). Pediatrics 1977; 100 (6): 1035-1039

15. American Academy of Pediatrics Committee on Nutrition. Policy statement. Prevention of pediatric overweight and obesity. Pediatrics (serial online) 2003; 112(2);424-430